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ABSTRACT

The use of the laserdisc in the classroom is described. Major advantages of the laserdisc are durability and large information storage capacity. Connecting the laserdisc with a microcomputer allows quick access to and interaction with the information it contains. Five uses of the system are further discussed: archival, demonstration, illustration of a lecture, interactive, and student reports. (CL)

Laserdisc Technology In The Classroom

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Educators will generally agree that there are at least three criteria for good learning: 1) Access to quality information; 2) The ability to interact with that information in a meaningful way; and 3) Feedback as to the level of understanding of that information. Using the laserdisc interfaced with a computer allows educators to create lessons that meet these criteria. Creation of lessons can be easily accomplished by using a simple authoring system called LaserWorks. This system allows for at least five different uses: 1) Archival; 2) Demonstration; 3) Illustrating lectures; 4) Interactive; and 5) Student reports.

Most educators would agree that learning is at the heart of education. Most educators would also agree that there are at least three criteria for learning.

Those criteria are:

1. Access to quality information.
2. The ability to interact with that information in a meaningful way.
3. The ability to receive feedback as to the level of understanding of the information.

The marriage of the laserdisc with the microcomputer gives the quality information we desire as well as the access, feedback, and control we need to use it effectively.

The laserdisc is a marvel of today's technology. It looks like a 21st century phonograph with its shiny aluminum surfaces. The aluminum contains laser-created pits and smooth spots that are translated by another laser into the audio and visual information we wish to access. That fact alone is one of the greatest advantages of

laserdisc. Because the information on the disc is in the pits and smooth spots , there is no film to fade, tape to stretch, or vinyl to be scratched. That means that the information stored on the disc will not distort as easily as other mediums with normal use.

Another advantage of this medium is the amount of information it can store. A single 12" laserdisc has the potential to store the equivalent of 108,000 slides. That number is equivalent to 1350 eighty slide carousel trays. Plus, the information stored can be from any previously used medium such as films, graphics, text, electron microscope slides, etc.

Laserdiscs are also indexed to allow random accessibility. Most educational discs are indexed by chapters and individual frame numbers. Other discs are often indexed by minutes only or minutes and seconds.

The variety of information available on laserdisc is extensive and constantly expanding. These topics are all covered on laserdisc:

* The entire collection of the National Gallery of Art.
* The NASA 3-D photographs from flybys of Saturn and Mars.
* Microscopic slides of blue-green algae or conjugation fungi.
* A complete Palomar sky survey.
* The history of aviation and space flight from the National Aeronautic and Space Museum archives.
* Slides of rocks and minerals.
* The flags of the world.
* Films of the repair of Solar Max.
* Slides of mammals, birds, plants, insects, spiders, and fish.
* Aerial photos of vegetation zones and landforms.

* Slides and diagrams of mitosis, chromosomes, protein synthesis, and the structure of DNA and RNA.

Connecting a microcomputer with the laserdisc allows quick access to and interaction with the information it contains. In its simplest form, the marriage creates problems for the majority of users who don't know how to speak the language of the laserdisc player.

That problem has been addressed by the creation of an authoring system called LaserWorks. LaserWorks allows the user to easily create lessons specific to their needs. It uses English (not computerese) cues to help the user make necessary decisions. For example, to put a page of text in the lesson, the command Text is used. To include a frame from the laserdisc, the command frame is used. LaserWorks thus allows for the simple creation of lessons at any level of sophistication and with different methods of presentation.

There are several ways to use this system. Following is a description of only five. These are archival, demonstration, illustration of a lecture, interactive, and student reports.

The use of the laserdisc as an archive is the easiest use to see. The teacher can ask the laserdisc to display any information it contains in any method of organization desired. An art history lesson can include examples of 19th century French painting, Impressionist paintings, paintings by Renoir, or a selection of works with a similar theme. The zoology lesson can include pictures of vertebrates, invertebrates, freshwater and marine animals--a huge choice of high resolution close-ups are at the fingertips of the instructor at a moment's notice. The history lesson can offer maps, diagrams,

documents, costume examples, and trade routes. The astronomy lesson can show NASA photos of the sun, moon, Jupiter, or the making of the space telelscope. This is information at its best and most abundant. The laserdisc can also be used to demonstrate and teach activities that require movement. Actual hands can be shown making intricate Origami folds. Entire lessons in sign language or knot tying can be given. Dances can be demonstrated. All can be shown with complete control of the action at the touch of a key. Back up, go forward, play in slow motion, play with stop action--all of these are possible without rewinding and searching, and without resolution loss.

Using two different screens (one for video and one for text) allows for the third use of the system, illustrating lectures. A teacher may want to present a lesson on cell division. It would be possible to have a slide showing a phase of division with either a title or a full-page description of the phase on the other screen. A variation would be to use the system in a learning center type of situation. An entire lesson could be presented with text and audio/visual materials presented simultaneously on separate screens. The system could also be used to provide reading practice. A series of pictures could appear on one screen with their names on the other screen.

A more exciting use of the system is for interactive lessons. This means the student must actively participate i the lesson causing interest to be maintained and learning to be enhanced.

In the following interactive lesson, the computer presents information, asks for a response, and then directs the student towards more critical observation. (1)

After having reviewed information on insects, a student comes to a screen that asks him to look at the following animals closely because he will be asked about their most obvious similarity. The student pushes a button and a series of four dragonflies appear. The computer then asks, "What characteristic did all those dragonflies have in common?" The student responds with, "Beautiful wings". The response from the computer is, "You're right, they do have wings, but did you notice how many? The number of wings can be important in classifying animals." After reading this, the student is given another chance to answer the question. The student types in "Four wings" and the computer responds with, "You're right. They have four wings. A good observer notices details such as the number of wings."

The student in the above lesson could have answered the question in a number of different ways. The computer would have responded to each response in a way deemed appropriate by the creator of the lesson. With that type of feedback, the student would know how well the material had been understood and what topics needed to be reviewed.

The fifth way to use the system is to allow students to write their own reports. With only minimal instruction students have created reports, peer teaching lessons, and oral reports that utilize the audio/visual information available.

Keep in mind the uses described above are only a sampling of the many ways this system is currently being used. Teachers are constantly discovering new applications for this new technology. The information available and the ease with which it can be accessed gives educators a wonderful new tool that is limited only by the user's creativity.

Footnotes

(1) This lesson was taken from a software lesson written by Dr. Robert L. Blodget. It is not available for commercial distribution.